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AUTHOR Schumacher, Sally
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ABSTRACT

Although previous conceptualizations have made distinctions among two types of research, this paper suggests conceptual distinctions among three types of research: basic, applied, and evaluation. In an evolving field, distinctions are based on recent writings and the elaboration of evaluation research as different in emphasis from basic and applied research. This paper, in addition, illustrates the distinctions among the functions of basic, applied, and evaluation research with empirical studies in adult education. The conceptual framework for the distinctions among basic, applied and evaluation research was developed from both the literature and actual uses of empirical studies. The paper concludes that there seems to be consensus that basic, applied, and evaluation research are important and there is a necessity to nourish all kinds of research. Understanding the functions of basic, applied, and evaluation research aids in conducting, reading, and using research. (KC)

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FUNCTIONS OF RESEARCH: A CONCEPTUAL ANALYSIS OF BASIC, APPLIED AND EVALUATION RESEARCH AND ITS APPLICATION IN ADULT EDUCATION

Sally Schumacher, Ph.D.
Virginia Commonwealth University

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FUNCTIONS OF RESEARCH: A CONCEPTUAL ANALYSIS OF BASIC, APPLIED AND EVALUATION RESEARCH AND ITS APPLICATION IN ADULT EDUCATION

INTRODUCTION: PROBLEM AND METHODOLOGY

Educational researchers and scholars have noted the differences between basic and applied research (Kerlinger, 1979, and Cook and Campbell, 1979) and between basic and evaluation research (Worthen and Sanders, 1973, and Campbell, 1982). Previous conceptualizations have made distinctions among two types of research, however, this paper suggests conceptual distinctions among three types of research: basic, applied and evaluation. In an evolving field, distinctions are based on recent writings and the elaboration of evaluation research as different in emphasis from basic and applied research (McMillan and Schumacher, 1984). This paper, in addition, illustrates the distinctions among the functions of basic, applied and evaluation research with empirical studies in adult education.

The conceptual framework for the distinctions among basic, applied and evaluation research was developed from both the literature and actual uses of empirical studies. A differential-type analysis (Soltis, 1978) is appropriate when a concept, i.e. research, seems to have more than one standard meaning and the basis for differentiating between meanings is not clear. The characteristics of each type of research was identified to develop a topology. In a conceptual analysis, a topology represents a necessary and essential condensation of meanings. The differential-type analysis distinguishes among the standard meanings of the concept and provides a clearer idea of the logical domain of the concept research.

The topology of Functions of Types of Research (See Figure) identifies distinctions among basic, applied and evaluation research in seven categor-

Functions of Types of Research *

	BASIC	APPLIED	EVALUATION
Topic of Research:	Physical, behavioral, and social sciences	Applied field: medicine, social work, engineering, education	Practice in a given site or sites
Purpose:	1. Test theories and/or discover scientific laws, basic principles 2. Determine empirical relationships among natural and social phenomena 3. Determine analytical relationships among past and present events	1. Test the usefulness of scientific theories within a given field 2. Determine empirical relationships within a given field 3. Determine analytical relationships among past and present events within a given field	1. Assess the merit of specific practice 2. Assess the worth of a specific practice
Typical Role of Investigator:	Scientist[1]	Researcher within a given field	Researcher in a given field and/or practitioner in a given site or sites
Level of Discourse:	Abstract, general within science	Abstract, general within a given field	Concrete, specific to a particular practice
Generalizability of Explanations:	Relate to physical, behavioral, and social sciences	Apply to a given field	Apply to a specific practice in a given site or sites
Functions:	1. Add to scientific knowledge of basic laws and principles 2. Advance further inquiry and methodology	1. Add to research-based knowledge in a given field 2. Advance research and methodology in a given field	1. Add to research-based knowledge about a specific practice 2. Advance research and methodology of a specific practice 3. Aid in decision-making at a given site
Intended Ultimate Outcomes:	Accepted body of scientific knowledge in physical, behavioral, and social sciences	Accepted body of research-based knowledge in a given field	1. Change of practice at a site or sites 2. Knowledge in related applied field

[1] Mitroff and Kilmann (1978) suggest four types of scientists and methodological approaches: analytical scientist, conceptual theorist, conceptual humanist, and particular humanist.

* McMillan, J. and Schumacher, S. (March, 1984). Research in education: A conceptual introduction. Boston: Little, Brown, and Co., pp. 9-10.

ies: topic of research, purpose, typical role of investigator, level of discourse, generalizability of explanations, functions, and intended ultimate outcomes. Included in the analysis is both qualitative and quantitative studies. Some of the common misconceptions about the functions of basic, applied and evaluation research and the contributions of each type of research in furthering inquiry and developing methodology are identified.

Before discussing the differences among these three types of research, we need to define "field," "discipline," and "science." Field, in this paper, is an area of research, knowledge, and practice which is more than a single academic discipline. Academic knowledge is organized by disciplines usually classified as physical, behavioral, and social sciences. Physical science is the study of the natural universe and includes disciplines such as chemistry, physics, geology, and astronomy. Behavioral science is the study of an organism and includes disciplines such as biology (animal), botany (plant), and psychology (human). Social science is the study of human social systems and includes such disciplines as anthropology, sociology, social-psychology, history, political science, economics. Although scholars and scientists debate definitions of science and academic disciplines and whether a particular discipline is a science, they generally agree that the area of research investigation distinguishes physical, behavior, and social science.

BASIC RESEARCH

Basic research is conducted in the physical, behavioral, and social sciences. Kerlinger (1979, p. 283) states that "basic research is research done to test theory, to study relationships among phenomena in order to understand the phenomena, with little or no thought of applications of the

results of the research to practical problems." Basic research is concerned exclusively with knowing and understanding natural and social phenomena. Scientists want to know how phenomena relates and to predict these relationships. To understand phenomena is to explain the phenomena. A theory is an explanation, a systematic account of relationships among a set of variables. A psychologist may propose a theory of leadership, or like Freud, a theory of human motivation, or like Piaget, a theory of human knowing. Such theories are systematic attempts to "explain" empirical phenomena by postulating the relationships among the phenomena and a number of "explanatory variables" (Kerlinger, 1979, p. 15). An analytical generalization also explains relationships, but these relationships are of past events. Thus, the generalization that "wars are caused by social, economic, and political movements occurring before the military action" is an explanation.

By testing theories, a scientist may also discover a basic principle or law. If a theory has been consistently supported by research, then it may be called a scientific law. A scientific law is generalizable - that is, it explains many individual cases. The results of basic research verify, modify, or reject the theory under investigation. The ideal procedure for testing theories is true experimental design conducted in a laboratory where variables can be manipulated by a scientist under controlled conditions and the experiment can be replicated many times. However, even in physical sciences, such as astronomy, the laboratory experiment cannot always be used. Both quasi-experimental (Cook and Campbell, 1979) and case study design can discover theory. Glasser and Strauss (1967) suggest ethnographic procedures to discover "grounded theory," that is theory which is grounded in the reality of a specific situation, developed from the data, with no intention of manipulation of variables or control of the research situation. After the

"grounded theory" is developed, further research is necessary for verification and generalizability.

As Kerlinger (1979, p. 12) notes, "general laws, general statements of relationships, are necessarily abstract because they must apply to many specific cases." Without such abstractness, there would be no science. For example, S. Merrian and L. Mullins (1981) tested the saliency of Robert Havinghurst's adulthood tasks on 540 adults who represented three income levels and three age groups. In general, the adults in this study considered Havinghurst's developmental tasks to be important today, but when the responses were compared in groupings of income level, sex and age, differences appeared with regard to the relative importance of the tasks. Thus, the underlying theory was questioned. The research purpose of D. J. Levinson (1978, p. x), was to "create a developmental perspective on adulthood in men. . . a systematic conception of the entire life cycle, which paying particular attention to the major seasons of adulthood." The findings of both studies are abstract to encompass the specific subgroup analysis of the cross-section sample of the adult Roanoke, Virginia, population and of the cases of the 40 men. My colleague, Rosemary Caffarella is studying "The In-Between Generation: Women in Their Thirties" to provide basic knowledge about adult development of women.

The results of basic research are related to previous research and knowledge within the science or academic discipline. Basic research has never been designed for solving human and social problems, making decisions, or taking action. To do this would require a leap from the abstract level of discourse to a concrete and specific level and might erode the scientist's

committment to objectivity. The Merriam and Mullins study suggests very general "concluding thoughts" on the implications of the findings for adult education and the Levinson study primarily relates the findings ("each of them is a hypothesis that requires further testing," p. 322) to previous theories of Erikson, Jung, G. P. Ridder, and others. It is very difficult for basic research to produce results which practitioners can immediately apply.

A single study adds to scientific knowledge, but it seldom, by itself, establishes accepted knowledge. As Campbell noted (1982), "scientific truths are a collective product of a community of scientists at any given time." Science is influenced by its historical context, philosophies of science, paradigm dependence, the "human judgment discretionary components" of research, and the social process to establish a body of scientific knowledge. The effects of basic research are indirect and are felt only over a considerable period of time.[2] Deeper understanding of phenomena is slow because it challenges fixed sets of beliefs and dogma. Trends in theoretical thinking and a series of studies have the greatest probability of an impact. But, the impact is general and abstract, not specific and concrete. Scientific theories found in textbooks stimulate thinking and a series of studies may influence ways of questioning, perceiving and reacting, but they do not tell a practitioner what to do in a given situation. Both the Levinson and the Merrian and Mullins studies focus on adult development - a social and psycho-

[2] Establishing knowledge is a slow process, whether the knowledge is nomothetic or idiographic (Maslow, 1966). Nomothetic means law-making; idiographic means to describe things individually. Disciplines can be characterized as nomothetic (physics, economics) or as ideographic (anthropology, history). Both types of knowledge are important, but different.

logical phenomena, not a programmatic phenomena - which may or may not effect educational practices by influencing how adult educators perceive their students.

Additional functions of basic research are to advance further inquiry and develop methodology. Psychology, for example, has been influenced by Gestalt (holistic), psychoanalytic, behavioralistic, and cognitive theories. Each of these have their tradition in research. Usually a single study will suggest new research questions or empirical gaps in the testing of a theory. A synthesis of research frequently indicates research problems which need investigation. If the influence of science is indirect, the influence of methodology is even more indirect. Before the 1930's, most experiments were done with only two variables, independent and dependent. After the invention of analysis of variance, more realistic and theoretically interesting research could be done using two or more independent variables. Methodology also influences the thinking of scientists. The essence of multiple regression is the simultaneous effects of many variables on a dependent variable. It may be that after 10 to 20 years of usage of multiple regression analysis, scientists no longer think in terms of a single influence.

Basic research may <u>indirectly</u> effect applied research by identifying theories to be tested in an applied area. Thus, the Boraks and Schumacher (1981) ethnographic study on word recognition strategies of adult beginning readers suggested that the importance of developmental tasks and the seasons of adult development provided little explanatory power for understanding adult beginning readers. My colleague, C. Londoner, found in his study of adult high school students (1972), that Parsons' action model may be useful to explain nonperserverance-perserverance patterns, especially if confirmed by other studies.

APPLIED RESEARCH

Applied research is conducted in a field of common practice while basic research is conducted within a science or an academic discipline. An applied field is concerned with the application of knowledge to a general practice and the development of research-based knowledge about those practices. Medicine, engineering, social work, and education are applied fields which use scientific knowledge but are not themselves science. Although it is sometimes difficult to distinguish between an applied field and a science, the basic purpose of each differs. The purpose of science is to understand natural and social phenomena without consideration for its application to practical problems. Applied research is directed toward practical applications of knowledge. "Applied research (as opposed to basic research) is mission-oriented and aimed at producing knowledge relevant to providing a solution (generalizable) to a general problem" (Worthen and Sanders, 1973, p. 23). In other words, applied studies focus on research problems common to a given field such as the "Effects of adult learner participation in course planning on achievements and satisfaction" (Rosenblum and Darkenwald, 1983), the "Effects of fees on clientele characteristics and participation in adult education (Boshier and Baker, 1979), "Personological variables related to GED retention and withdrawal" (Wilson, 1980), and "Comparative study of adult education practitioners and professors on future knowledge and skills needed by adult educators" (Daniel and Rose, 1982).

Applied research tests the usefulness of scientific theories and determines empirical and analytical relationships within a given field. For example, a scientist might investigate and try to understand human intelligence in its many manifestations, including schooling. An educational

researcher might determine the relationship between intelligence and achievement or the relationship of different modes of instruction, classroom interaction patterns, or sets of materials to achievement. An educational researcher might analyze federal court rulings on the instructional use of certain books.

Applied research, similar to basic research, is abstract and general, but limited to the delineated field. Most applied fields have a technical language common to those in the profession. Terms such as ABE, GED, adult development, andragogy, and self-directed learning have special meanings in adult education.

The generalizability of applied research is limited by focus and usually by design. The focus is the applied field, not universal knowledge. In education, most research is non-experimental or quasi-experimental design. Unlike the pure scientist working in a laboratory where randomization of subjects is more feasible, the applied researcher is dealing with a valuable resource which is "distributed according to need, merit, seniority or on first come, first serve" (Cook and Campbell, 1979, p. 57). Students are assigned to classes based on instructional need. Teachers and administrators are assigned to positions based on merit or seniority. Whereas twelve threats to internal and external validity were possible with true experimental designs (Campbell and Stanley, 1963), over thirty threats to internal and external validity are possible with quasi-experimental designs (Cook and Campbell, 1979).

For example, Baskins and Baker (1979) investigated 27 client characteristics variables and the twenty-eighth variable of particulation in their study of the effects of fees. The relationship of 24 personalogical variables to 13 categorical variables of GED dropouts/persisters were studied by Wilson

(1980). The number of plausible rival hypothesis, i.e., variables in the applied field, increases when the research setting is viewed as a field rather than a laboratory.

Confusion and controversy in applied research centers on the difference between purpose and function. Despite the name "applied research," the results of most applied studies are rarely directly or immediately usable by practitioners in a given site. The practice which is studied may not be operating at a particular site. In the studies cited above, an adult education program may not have fees or may be using an individual programmed instructional approach. Implications for practice are general, not specific recommendations for immediate action. Thus, Boshier and Baker concluded from their study of the effects of fees that "with regard to educational entitlement and attempts to evoke participation from members of the lower socio-economic groups, the present study has helped reiterate what is already known: participation is a complex phenomenon stemming from multi-variate origins" (1979, p. 168).

Applied research does, however, influence the way practitioners think and perceive a common problem, stimulates further research, and suggests new theories of practice and of social science. Thus Rosenblum and Darkenwald (1983, p. 152) suggest that despite the finding that participation in planning had no direct effects on achievement and satisfaction, further research should control for the factor of motivation and investigate the effects on other dependent variables, e.g. greater group cohesion, self-directed learning, and the like. Applied research can also stimulate basic methodological research in analysis and in measurement, i.e. measurement of adult intelli-

gence. Both the Boshier and Baker and the Wilson studies used multivariant analysis. The need for more appropriate statistics to study such phenomenon as achievement, participation, personalogical and social-economic variables helps to reinforce the development of multivariant analysis, especially multiple regression analysis and path analysis (Kerlinger, 1979, pp. 287-88).

The intended ultimate outcome of applied research is an accepted body of research-based knowledge in the given field. Similar to basic research, applied research develops a body of knowledge by "multiple participant mutual self-disciplining" (Campbell, 1982). When a series of studies are presented, published, debated, and critiqued for a considerable time, this knowledge may be accepted as "scientific truth." The mutual self-disciplining usually occurs within professional associations and special conferences.

EVALUATION RESEARCH

Evaluation research focuses on a particular practice at a given site. The practice may be a program, a product, or a process. The site is crucial in evaluation research. Evaluation research assesses the merit and worth of a particular practice in terms of the values operating at a single site or more than one site. Evaluation determines whether the practice works - that is, does it do what is intended at the site? Evaluation determines whether the practice is worth the costs of development, implementation, or widespread adoption. Costs may be those of materials, time and space, staff skills and morale, and community concerns. Most basic research produces nomethetic knowledge, i.e., statements of relations; most evaluation research produces idiographic knowledge, i.e., descriptions of a particular practice with respect to one or more scales of values (Worthen and Sanders, 1973, pp. 26-38). Examples of evaluation research are "Organizational barriers to

the administration of correctional education: An analysis of a correctional school district" (MacNeil, 1980), "Adult basic education in Ohio: A program impact evaluation" (Boggs, Buss, and Yarnell, 1979), and "Determining the learning needs of the older adult in a rural community: Perceptions of the service provider" (Nelson, 1983).

Whereas basic research is conducted by a scientist and applied research by an educational researcher, evaluation studies may be done by a researcher in a given field and/or a practitioner at the site. Evaluation research, which is as rigorous as other types of research, requires specialized training in several methodologies and disciplines and skills in interpersonal relations and communication. A comprehensive evaluation consists of both quantitative and qualitative data from a series of studies conducted at different implementation phases of the practice.

An evaluation study is communicated in concrete language, specific to the practice and meanful to the participants. The findings should have "site-specific interpretability" (Campbell, 1982). Because evaluation aids in immediate decision-making, the findings usually have limited generalizability. Both applied and evaluation research may study practices common to many educational settings, but evaluation focuses on the specific implementation at a given site or sites. Thus, Nelson's study of learning needs of older adults in a rural community focused on two types of learning, two learning activity levels and three modes of instruction. The impact study in Ohio focused on "changes in their lives" in six areas: involvement, employment, children/school, voting, homeownership, and education. The evaluation of pilot modules for the teaching of reading strategies to beginning adult readers focused on student learning, teacher usage, adaptability of each

module, implementation needs, appropriate student group and instruction use in Virginia ABE programs with specific recommendations for module revision (Schumacher, 1982).

Evaluation aids in decision-making processes but it does not provide a ready-made "solution" to a problem. Evaluation findings may be only one consideration because of the difficulties in conducting a comprehensive evaluation on changing practices. A well designed and timely report can have an impact by assessing multiple intended and unintended outcomes, identifying concerns of various constituencies, and recommending possible alternatives. Although recommendations are more specific than implications of applied research, these statements are suggestions. A competent evaluator will note the tentativeness of the findings and plausible rival hypotheses. But, the evaluator cannot scientifically predict subsequent events if recommendations are implemented. Evaluation research adds a research-based knowledge about a practice to other sources of knowledge at the site.

An evaluation study, if so designed, can provide more general knowledge on a specific disseminable practice. This has seldom been done because the models for such research are still evolving. Campbell (1982) suggested two approaches: a "cross-validating contagion model" and competitive models. The "cross-validating contagion model" has two phases. The first phase provides local program funds for developing and implementing a program with consultants and evaluators to meet local needs. If the program produces a valid, disseminable innovation, then the second phase design cross-validates the innovation. Adopters of the innovation are funded to provide comparisons among adopters and between adopters and non-adopters without losing "site-

specific interpretability" of evaluation results. After five years, there would be field experiments of the disseminated innovations for a community of scientists and practitioners to assess.

A second approach to develop more general knowledge about specific practices are competitive models. Some of these models have been tried on Head Start Programs and Follow-Through Programs. Competition would be encouraged by (1) funding two or more comparison implementation sites which use different methodologies to assess the same practice, (2) encouraging competitive reanalysis of computer-stored data on the same practice, and (3) providing access to the same data base of the evaluation for minority reports.

Evaluation research can stimulate further research and methodological development to study practices. Qualitative, holistic analysis of the site context has emphasized the importance to historical and ethnographic methodologies. Assessment of achievement encouraged criterion-referenced testing and measurement in areas not previously attempted by specialists, i.e., adult learning. Evaluation studies often identify variables or suggest hypotheses for other evaluation studies and applied research. Thus, the Ohio impact study suggests refinements in measurement if a personal interview is used and the assessment of learning needs study suggests the global categories of instrumental and expressive needs are "much too broad."

The intended ultimate outcomes of evaluation research are (1) change of the particular practice at the given site or sites and (2) knowledge in the related applied field. Comprehensive, timely evaluation studies influence site decisions as the practice is developed, implemented, and institutiona-

lized. A series of evaluation studies on a particular practice at diverse sites such as Head Start programs or organizational changes processes in private schools can add to the existing knowledge in the applied field. Some evaluation studies, especially large-scale studies with several research components, can have an exploratory study or a theory testing study for theory development while other research components focus on "site-specific interpretability" of findings for local needs.

IMPLICATIONS

There seems to be concensus that basic, applied and evaluation research are important and that there is a necessity to nourish all kinds of research. Understanding the functions of basic, applied and evaluation research aids in conducting, reading and using research. Rarely is a single study equally adequate as basic, applied and evaluation research because the functions and level of discourse differ. The researcher relates the findings to the functions of one or more types of research. The consumer of research judges the findings as they relate to the functions of research. Most studies are judged adequate as one type of research and less adequate for other types of research.

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